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A VISIT TO THE GREAT SMOKIES

JOHN M. FOGG, JR.

The annual Spring Tour of the students of the Arboretum School took place from May 19 to 28, 1971, and featured a ten-day trip to Great Smoky Mountains National Park in North Carolina and Tennessee.

Our party of 30 persons departed from 57 Lapsley Road early on the morning of Wednesday, May 19, and proceeded by chartered bus westward along the Pennsylvania Turnpike.

It was interesting to note that northeast of Elizabethtown we entered upon an area of Triassic red shale. This is the same formation which can be seen only a few miles north of Philadelphia at Fort Washington or Norristown. It then extends almost due west for about 50 miles before trending southwest to cross the Susquehannah River below Harrisburg. As is the case in Bucks, Montgomery, and other southeastern counties, these shales, which were deposited following the uplift of the Appalachian Mountains in Permian time, are traversed by more or less parallel extrusions of diabase or trap rock.

As we crossed the river below Harrisburg we caught a glimpse northward of the parallel ridges of the Blue Mountains (not the Blue Ridge) which form the eastern escarpment of the Appalachian Plateau.

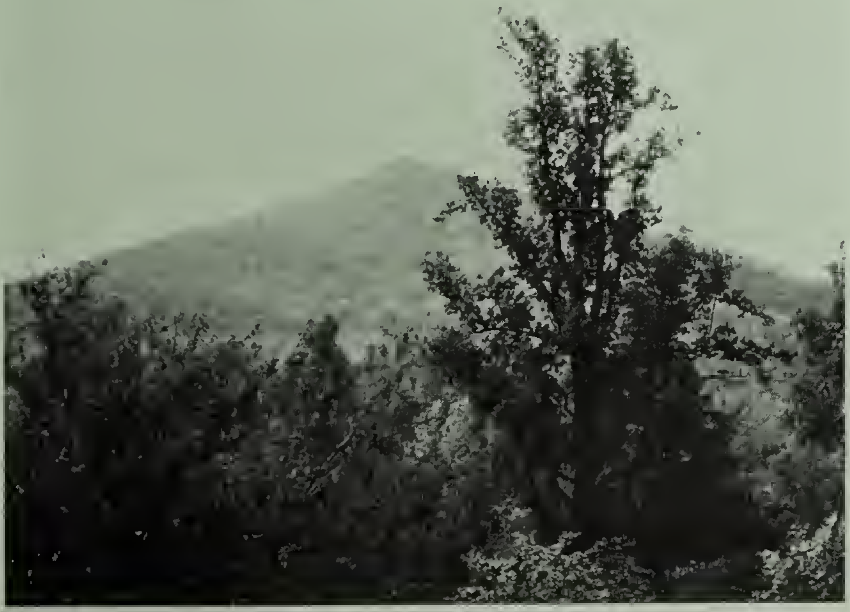

Fig. 1. Sharp Top Mt. from Peaks of Otter Lodge

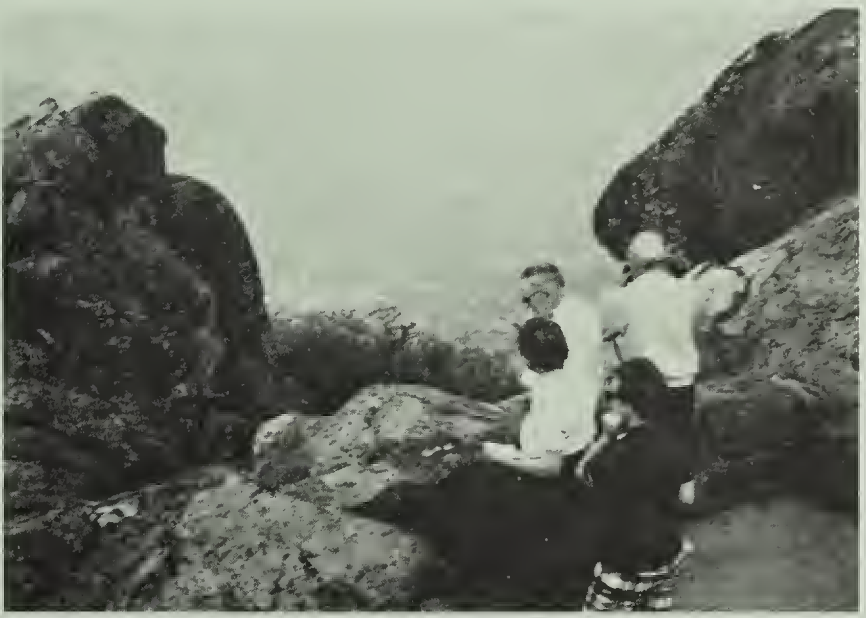

Fig. 2. Boulders on the summit of Sharp Top Mt.

We left the Pennsylvania Turnpike at Carlisle and drove south on U.S. 81 to Hagerstown, Maryland, where we stopped for lunch. Continuing southward to Staunton, Virginia, we there headed east through Waynesboro and entered the Blue Ridge Parkway at Rock Fish Gap, its northern portal.

This magnificent highway follows the crest of the Blue Ridge Mountains for 470 miles, connecting the Shenandoah National Park in Virginia with Great Smoky Mountains National Park in North Carolina and Tennessee. It ranges in elevation between 2000 and 6000 feet and its numerous outlooks provide views of some the finest scenery in the eastern United States.

As we drove southward along the Parkway the most impressive plant we saw was our eastern flowering dogwood *(Cornus florida).* Although somewhat past the peak of its bloom, the chalky white bracts were still holding on and for many miles this attractive small tree provided a backdrop for a wide variety of other species. The most conspicuous shrub was the lovely wild azalea or pinxter flower *(Rhododen-*

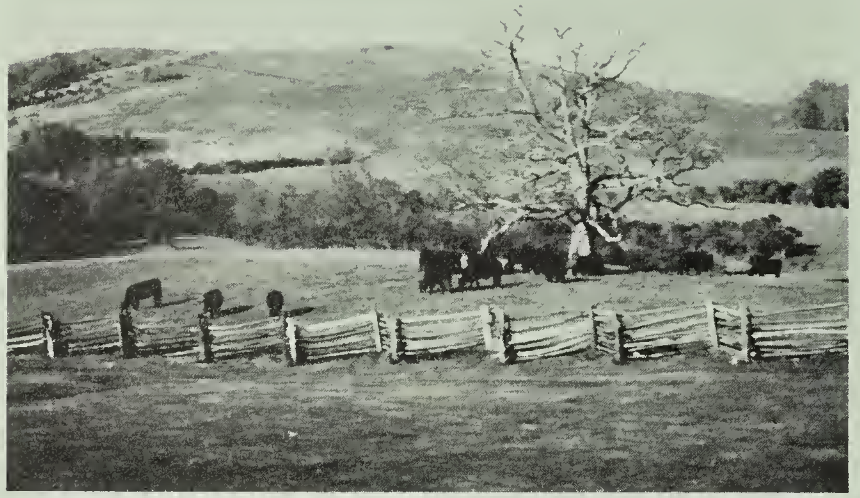

Fig. 3. View from Bluff's Inn. Large white oak in foreground.

dron nudiflorum), here at the very height of its bloom. Another shrub of frequent occurence was the red-berried elder *(Sambucus pubens)*, its upright paniculate inflorescences in marked contrast to the flat-topped corymbs of the much later flowering black-fruited *S. canadensis.* The mountain maple or moosewood *(Acer pensylvanicum)* was readily recognized not only because of its beautifully striped bark but also by its pendulous flower clusters. An occasional fringe-tree *(Chionanthus virginicus)* provided a delicate effect with its pure white tinsel-like flowers. The red-bud or Judas-tree *(Cercis canadensis)* was long past flowering, but its serried rows of reddish-brown pods proclaimed its ubiquitous occurrence in these mountain woods.

The choke cherry, *(Prunus virginianus)* on the other hand, was in full flower its long white racemes bearing a distinct resemblance to the later blooming *Itea virginica.*

On the forest floor the large white flowered wake-robin *(Trillium grandiflorum)* was ever-present but now, past the peak of its bloom, the petals were pinkish rather than pure white. In rare patches our eyes were treated to fleeting glimpses of the deep crimson flowers of the fire pink *(Silene virginica)*, while on an occasional roadside bank were colonies of the pinkish-flowered creeping phlox *(Phlox stolonifera).*

Toward the end of the afternoon we caught our first sight of the handsome evergreen pink-flowered *Rhododendron carolinianum.* This, perhaps more than anything we had seen, made us realize that we had left the Middle Atlantic States behind us and had entered into a different botanical province.

At the end of the day's run we pulled into the very comfortable Peaks of Otter Lodge, in Bedford County, Virginia. In front of the Lodge is a 24-acre lake and arising behind it is Sharp Top Mountain, a symmetrically conical peak with an elevation of 3875 feet. (Fig. 1).

The following morning we walked around the lake to the camp store where we purchased tickets for the local bus which was to convey us to the summit of Sharp Top. The road was far too narrow and winding for our own chartered coach to negotiate.

While waiting for our conveyance to arrive we had an opportunity to examine the vegetation at the foot of the mountain. One of the most conspicuous plants was an evergreen Ericaceous shrub known locally as dog-hobble or switch-ivy. This species has had a confusing nomenclatural career. Long known as *Leucothoe Catesbaei,* its name was later changed (as in the 1950 edition of Gray's Manual) to *L. editorum.* However, the earliest valid epithet is *L. fontanesiana* and as such it is called today. It occurs in the wild from Florida and Mississippi north to southeastern Virginia and is widely cultivated as a broad-leaved evergreen as far north as New England. It was here in full flower.

Another member of the Ericaceae which engaged our attention was the minnie-bush *(Menziesia pilosa).* This deciduous shrub, which bears a strong resemblance to the Oriental *Enkianthus campanulatus,* ranges from Georgia and Tennessee to Pennsylvania where it reaches its northern limit in Schuylkill County. Having "lived" with this species for three summers at Mountain Lake in Giles County, Virginia. I was delighted to renew my acquaintance with it here on the slopes of Sharp Top.

Among other plants which were of frequent occurrence were a low-bush blueberry *(Vaccinium vacillans),* the deerberry *(V. stamineum)* and the green osier *(Cornus alternifolia).*

Our bus finally arrived and after a tortuous climb deposited us at the summit of Sharp Top whence we had what is reputed to be the "finest view in the Blue Ridge". Far below was our Lodge with its lake; off to the west, as far as the eye could reach were the parallel ridges of the Appalachians and to the north was Flat Top, just a few feet higher than the one we were on. These two mountains constitute the Peaks of Otter, the river of that name flowing between them.

The summit of Sharp Top can best be likened to a pile of loose, irregular dioritic boulders deposited there by some gigantic bull-dozer (Fig. 2). For those of us who elected to walk down the mountain, rather than descend by the bus,

Fig. 4. View of Blue Ridge Mts. Mt. Mitchell in middle distance.

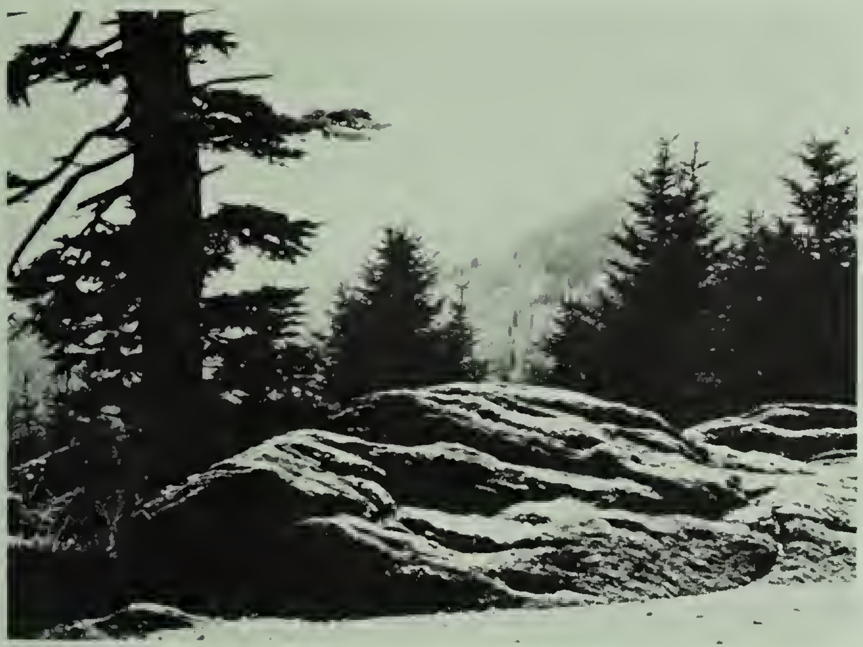

Fig. 5. Outcrops near top of Mt. Mitchell. Fraser's fir at left.

this made for rather rough going, especially the first few hundred yards. Gradually, however, the trail improved and we were able to take our eyes off the next step ahead and observe the plants around us. Here, in addition to *Acer pensylvanicum,* was the more shrub-like mountain maple *(A. spicatum).* Both of these essentially boreal species follow the Appalachian plateau south as far as northern Georgia and Tennessee. Another nothern species, with much the same distribution, was the mountain ash *(Sorbus americana),* here still in bud.

A short distance below the top we saw our first southern hemlock *(Tsuga caroliniana).* This graceful conifer, which has longer and narrower needles than the more widely distributed eastern hemlock *(T. canadensis),* occurs from Georgia north to Virginia and is seldom met with below 3000 feet.

At one spot where the trail leveled off there was a fine stand of the handsome yellow-flowered ladies' slipper *(Cypripedium Calceolus)* and near it were great quantities of the native lily-of-the-valley *(Convallaria montana.)* This plant, long believed to be identical with the cultivated *C. majalis* (which is a native of Europe), was recognized as a distinct species more than a century ago by Rafinesque. One difference is that the American plants occur as scattered individuals, rather than in dense clusters.

Another intriguing item was the red-fruited "blueberry" *(Vaccinium erythrocarpum).* This shrub, which was now in full flower, is here near the northern limit of its natural range. Its nearest relatives occur thousands of miles away in eastern Asia. Two other blueberries *(V. vacillans* and *V. stamineum)* were much in evidence as were such other Ericaceous plants as *Kalmia latifolia* and *Gaylussacia baccata,* all attesting to the acid-character of the soil.

Conspicuous on the forest floor as we descended were the giant chickweed *(Stellaria pubera),* wood betony *(Pedicularis canadensis)* and the attractive pink-flowered relative of the Oriental bleeding heart *(Dicentra eximia),* known locally as turkey corn. To the students of the Barnes School, who have long admired this *Dicentra* in the wooded areas of the arboretum, it was exciting to find it growing in such profusion in its native habitat.

At last we reached the foot of the trail which we had been told was one and a half miles; to some of the group it seemed at least twice that long.

Following lunch at the Lodge we re-entered the Parkway and proceeded southward for some 155 miles to Doughton Park, where we had reservations for the night at Bluff's Inn. This drive provided some very spectacular scenery, including frequent views of the Great Valley, to our west, Sugarloaf Mountain and Cumberland Knob.

It was along this stretch that we saw our first flame azalea *(Rhododendron calendulaceum)* in bloom. This gorgeous species occurs in a bewildering array of colors from light yellow through deep orange or scarlet to red. Its appearance that afternoon provided a preview of things to come.

Two other plants in particular challenged our notice on this leg of the trip. One was the hispid locust or rose acacia *(Robinia hispida),* a small tree with pendulous racemes of rose-purple flowers. The other was the umbrella magnolia *(Magnolia tripetala)* a spreading tree with stiff long-tapering leaves and large white flowers, ten to twelve inches across. Late that afternoon we checked in at Doughton Park.

The view from our rooms at Bluff's Inn was one of the utmost serenity: soft, undulating hills in the foreground, herds of browsing cattle and mile after mile of low mountains receding off to the east. (Fig. 3) It was the kind of place where one would have liked to linger, but a full schedule lay ahead of us and we departed from Doughton Park early on the morning of May 21.

As we drove south we were struck by the fact that *Magnolia tripetala* had largely departed from the scene and that its place had been taken by Fraser's Magnolia *(M. Fraseri),* a larger tree with "floppy" leaves and creamy-white flowers.

A shad-bush or service berry *(Amelanchier laevis)* was making a wonderful show. This essentially northern tree has leaves that as they unfold display a purplish tinge providing a beautiful contrast with the clusters of pure white flowers. Another northern arboreal species which was all around us

Fig. 6. Biltmore Mansion

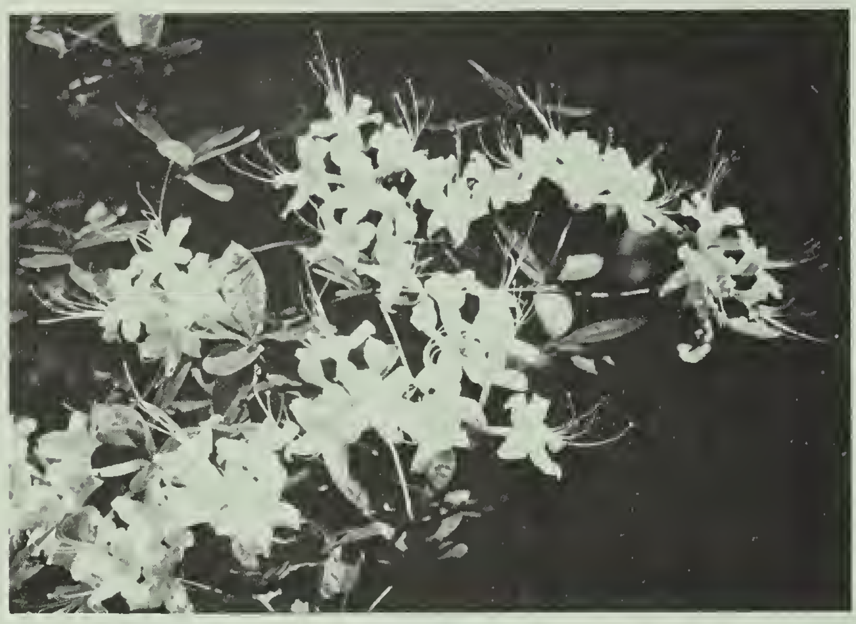

Fig. 7. *Rhododendron atlanticum* at Biltmore.

was the plant variously known as pin cherry, fire cherry or bird cherry *(Prunus pensylvanica).* We all knew what a handsome display this makes in the autumn with its scarlet foliage, but I doubt if any of us were prepared for the marvelous effect of its profuse white flowers in the spring. Both the service berry and the cherry seemed to us to grow taller here than in the woods of New England.

At several lookouts we paused to enjoy the panorama of the surrounding mountains. From one of these we caught a glimpse of Mt. Mitchell, many miles distant (Fig. 4).

Near the 300 mile marker we had a fleeting view of Blowing Rock and then toward noon we left the Parkway and followed a well constructed road which took us to within a few feet of the summit of Mt. Mitchell. (Fig. 5) With an altitude of 6684 feet, this is the highest peak east of the Rockies. We climbed to the top of an observation tower and, since the day was remarkably clear, were favored with a superb view of much of the Blue Ridge, including the Great Smokies many miles to the southwest.

At the base of the tower is the grave of Dr. Elisha Mitchell, pioneer scientist, who lost his life on the mountains in 1857.

The upper third of Mt. Mitchell is densely clothed with coniferous forest composed mainly of two species: red spruce *(Picea rubens)* and Fraser's fir *(Abies Fraseri).* The spruce is still another example of a prevailingly northern species which extends southward along the mountains to North Carolina and Tennessee. The fir, on the other hand, is a southern plant which reaches its northern limit in Virginia.

That afternoon we saw our first hobble-bush or witch-hobble *(Viburnum alnifolium),* a robust shrub that was making a fine show with its large white sterile florets. This species, too, ranges from Canada southwestward along the Appalachians. Although seemingly most at home in low moist woodlands northward, here in these mountains it occurs at considerable altitudes; we later saw it near the top of Clingman's Dome.

We were also so fortunate as to catch a glimpse of the mountain rosebay *(Rhododendron catawbiense)* just coming into flower. This handsome evergreen relative of our northern *R. maximum* is restricted to the southern Appalachian Mountains.

The end of the day's run found us at the attractive Mt. Pisgah Inn near the 410 mile marker. A wooded trail in front of our cabins provided a number of pleasant surprises, including the maroon-flowered *Trillium Vaseyi,* the squaw root *(Conopholis americana)* and a small colony of the Oconee-bells *(Shortia galacifolia)*

The last-named is the plant which Asa Gray described as a new genus (for Dr. C. W. Short of Louisville, Kentucky) from an herbarium specimen in the Michaux collection in Paris in 1839. Although the pressed specimen which Gray examined was not in flower, he correctly assigned it to the Diapensiaceae, the same family which includes *Galax aphylla* of our southern moutains, *Pyxidanthera barbulata* of the Atlantic Coastal Plain and *Diapenisa lapponica* of circumboreal tundra and alpine passes.

The following morning, Saturday, May 22, we backtracked some twenty miles to Asheville, N.C. to visit Biltmore, the monumental estate of the late George W. Vanderbilt. The vast mansion, modeled after the chateaux of the Loire, is awe-inspiring in its magnitude and elegance, and even those of us who had visited it before were glad to have the opportunity of seeing it again. (Fig. 6).

The timing of our visit to the gardens was somewhat less than perfect; we were a bit late for the early flowering rhododendrons and a trifle ahead of time for the later ones. Nevertheless, *R. catawbiense* was about at its height and the pure white-flowered *R. atlanticum* was putting on a great show. (Fig. 7).

There was much else here to see and enjoy: an incredibly long grape-arbor, a representative collection of roses and clematis, a splendid espaliered specimen of the double-"flowered" dogwood *(Cornus florida pluribracteata)* and several fine plants of the very rare Ericaceous shrub, *Elliottia racemosa,* unfortunately not yet in flower.

On all sides were mature conifers and hardwood trees, among the latter being an enormous European hedgemaple,

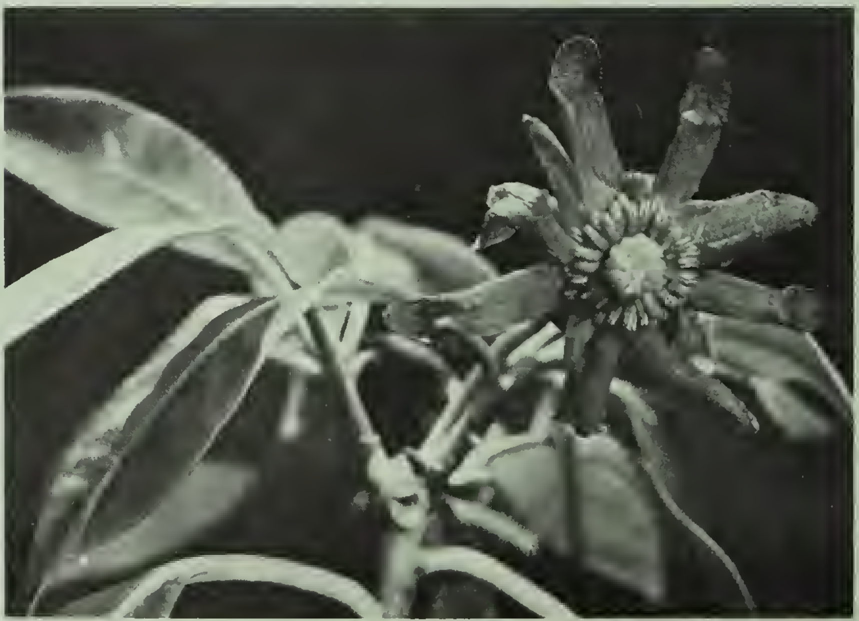

Fig. 8. *Illicium floridanum.*

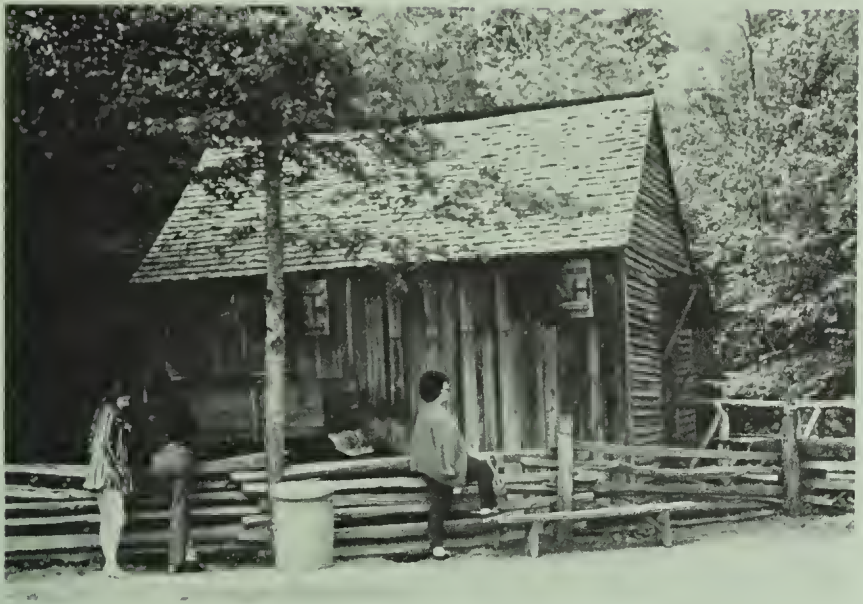

Fig. 9. Grist Mill in Cades Cove

Acer campestre. A plant which we were pleased to find in full bloom was the purple-anise *(Illicium floridanum),* a southern relative of the magnolias with dark red wheel-shaped flowers. (Fig. 8).

Returning to the Parkway, we stopped to eat our box lunches in full sight of Mt. Pisgah. Here again, we were impressed by the marvelous display afforded by *Amelanchier laevis* and *Prunus pensylvanica.* Near here we saw our first *Pieris floribunda.* This species, which differs from *P. japonica* in its ascending inforescences, deserves to be much more widely cultivated than it seems to be.

In late afternoon we left the Parkway at its southern portal and, traversing the Great Smoky Mountains National Park in a northwesterly direction, arrived at the hostelry in Gatlinburg, which was to be our headquarters.

One Sunday morning, May 23, Mr. and Mrs. Robert D. MacDonald and their two small children joined our party. Mr. MacDonald, who is Director of the Tyler (Painter) Arboretum at Lima, Pa., was for several years in charge of the University of Tennessee Arboretum at Oak Ridge. He and his wife, who is a botanist, possess an intimate knowledge of the Great Smokies and they had very kindly flown down from Philadelphia to offer their services as guides during our three-day visit to the Park.

The establishment of the Great Smoky Mountains National Park was authorized by Congress in 1924 and the Park was formally dedicated in 1940. Of its approximately half a million acres, somewhat more than half lie in North Carolina, the remainder in Tennessee. It contains the loftiest ranges of mountains in the eastern United States; sixteen of its peaks exceeding 6000 feet in altitude. Geologically it constitutes one of the most ancient uplands on the continent of North America.

Within its boundaries occur 130 species of trees and more than 1300 kinds of shrubs and herbaceous plants, making it one of the richest botanical regions in eastern temperate America.

Leaving our inn at Gatlinburg, we entered the Park, drove past the Head-quarters at Sugarlands and for some miles followed the Little River to Cades Cove. Although to some persons the term cove may convey the impression of a bay or inlet, it is here applied to a narrow recess or hollow in a mountainous area. There are several such sites within the Park, but Cades Cove is perhaps the most famous.

At one time there were about a hundred families living in the Cove. Today only a few remain, but many evidences of former activities have survived. There are sturdy log cabins, primitive churches, a blacksmith shop, a grist mill, which still functions (Fig. 9), a sorghum mill, a cantilever barn and a fine example of an early frame house (Fig. 10). Our hour and a half spent here was most rewarding.

Following lunch we embarked upon a tour of the Oak–Pine Nature Trail. The oaks along this trail are of several kinds, mostly white *(Quercus alba),* scarlet *(Q. coccinea)* and chestnut *(Q. Prinus).* Of pines there are four species: white *(Pinus Strobus),* scrub *(P. virginiana),* pitch *(P. rigida)* and Table Mountain *(P. pungens),* the last-named being the most conspicuously prickly-coned species in the east. The only other common conifer at this elevation is the eastern hemlock *(Tsuga canadensis),* of which there were some fine specimens, although nothing so huge as some we saw later.

Among other trees there were beech *(Fagus grandifolia),* tupelo *(Nyssa sylvatica)* and of course tulip *(Liriodendron Tulipifera).* The great bay *(Rhododendron maximum)* locally known as laurel, here achieves almost arboreal proportions. The yellow-wood *(Cladrastis lutea)* and the black locust *(Robinia Pseudoacacia)* are conspicuous elements of this forest.

Those of us who were familiar with the flora of the Middle Atlantic States were certainly not prepared to see sweet gum *(Liquidambar Styraciflua)* and American holly *(Ilex opaca)* growing commonly in these woods. In the Philadelphia area the sweet gum is regarded as almost exclusively a tree of the Atlantic Coastal Plain, practically never transgressing the Fall Line to take its place on the Piedmont. The holly, too, is most frequently found on the dry to moist sandy soils of adjacent New Jersey, and while it is of casual occurrence in Southeastern Pennsylvania, we still think of it as primarily a plant of the Coastal Plain.

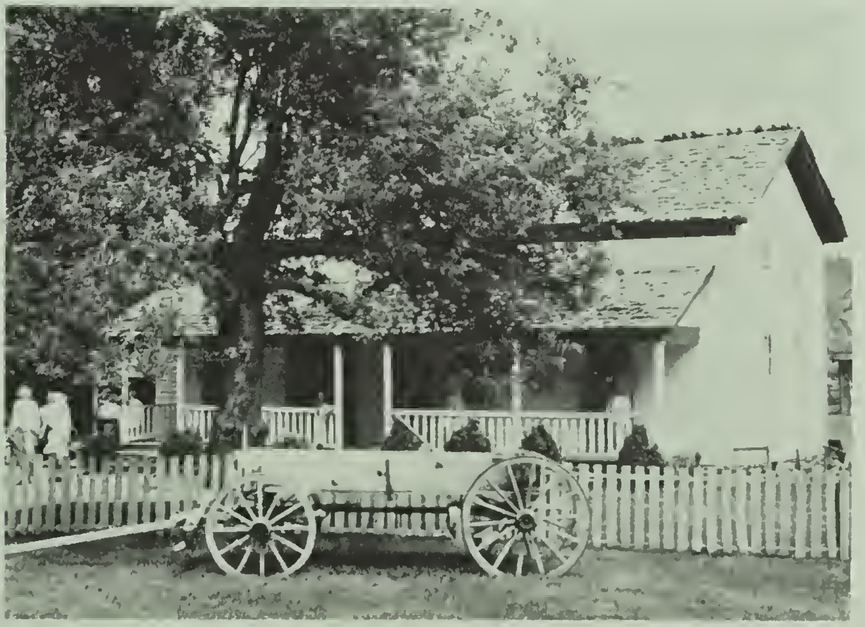

Fig. 10. Becky Cable House in Cades Cove

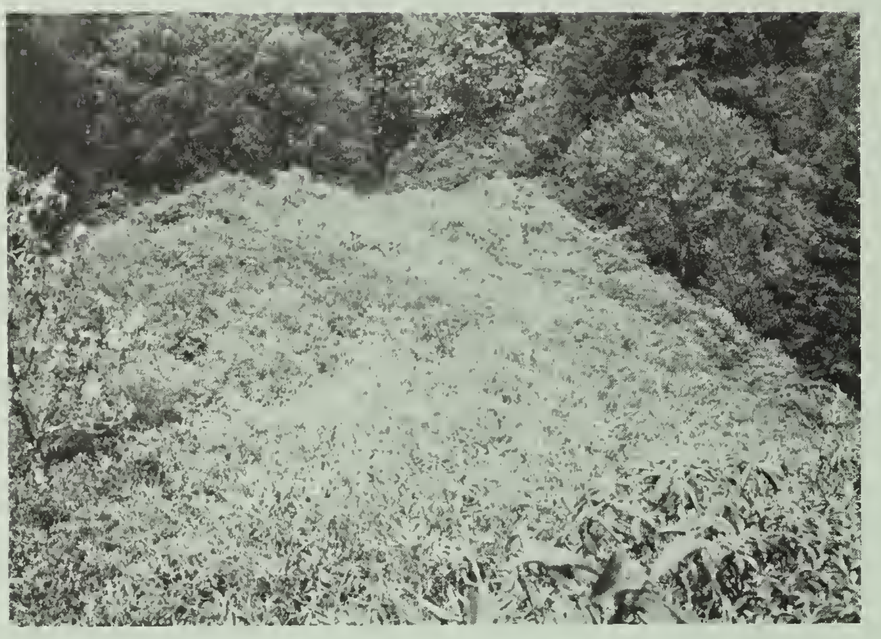

Fig. 11. Heath bald

Two other plants which we encountered along this trail interested us greatly. One was *Gaylussacia ursina,* a shrub known locally as buckberry, which is endemic to these mountains. The other was the oil-nut or buffalo nut *(Pyrularia pubera)* a member of the Santalaceae or Sandal-wood Family. Like most members of the family this species is parasitic on other plants, in this case the roots of deciduous shrubs and trees.

The following morning we drove along the Little Pigeon River to the Big Locust Nature Trail which circles around for almost a mile through a dense hardwood forest. All of the trees we had seen the preceding day were here; in addition we observed huge specimens of linden or basswood *(Tilia heterophylla)* and white ash *(Fraxinus americana).* The yellow buckeye *(Aesculus octandra)* which we had seen sparingly before, was here common and some had trunks 3 or 4 feet in diameter. The chestnut, of course, is a thing of the past (except for sucker shoots from old stumps) but there are many enormous lifeless boles still standing in the Park and these are highly valued as a source of lumber for fence rails and other uses.

The silver-bell *(Halesia monticola)* was somewhat past flowering but the black locust was festooned with drooping white racemes. A fallen tree, believed to be the largest of its kind in the Park, gives its name to this trail.

On the forest floor there was a wealth of interesting material. We were delighted to see patches of the snowy-white *Phacelia fimbriata* a member of the Waterleaf Family. This, one of four species of *Phacelia* found in the Park, has pure white petals which are delicately fringed along their margins. The showy orchis *(O. spectabilis)* was in full bloom as was the yellow trillium *(T. luteum),* an intriguing species with mottled leaves and an upright yellow corolla. The boreal element, which we had now come to take for granted in these mountains, was represented by *Streptopus roseus, Hepatica acutiloba, Tiarella cordifolia* and *Hydrophyllum canadense.*

We paused to admire and photograph the Dutchman's pipe *(Aristolochia durior)* in flower. This is the vine with large cordate leaves that is so widely cultivated.

Returning to our coach we drove a short distance to the region of the Chimney Tops for the purpose of climbing up to one of the Park's heath balds. The features known as "balds" are treeless areas usually found on mountain summits or slopes. Their origin is not fully understood, although many theories have been advanced to explain their presence. Mrs. MacDonald kindly passed around among us copies of a paper she had written on the "Grassy Balds of the Great Smoky Mountains," in which she reviewed the literature on this subject. However, the area we were about to inspect was characterized by the presence of members of the Ericaceae, rather than grasses and sedges.

In order to achieve our objective it was necessary to crawl on our hands and knees up a steep slope under the low branches of *Rhododendron maximum.* We finally emerged on an open area (Fig. 11) where the characteristic plants were mountain laurel *(Kalmia latifolia),* a mauve-colored form of *Rhododendron minus,* and to our great delight *Leiophyllum buxifolium* var. *Hugeri,* now in full flower.

Leiophyllum is the genus of the sand-myrtle, that attractive low evergreen shrub which is such a dominant constituent of the vegetation of the Pine Barrens of New Jersey. To find it growing on the slopes of the Appalachians comes as something of a suprise until one realizes that as the Atlantic Plain emerged from the waters of the ocean it was colonized, at least in part, by plants which had long occupied these ancient ridges. (Fig. 12).

After descending from the heath bald we stopped for lunch among the boulders of Little Pigeon River (Fig. 13) and then drove up and across Newfound Gap before taking the southwestern fork which leads to Clingman's Dome. On this drive we ascended from 3000 feet to well over 6000. As we passed the 4000 foot level the character of vegetation changed rather abruptly from hardwood forest to conifers with red spruce and Fraser's fir dominant. As Mr. MacDonald remarked, "We are now in Canada."

At one point we stopped to inspect a beech gap which, as Mrs. MacDonald explained, occupies an area surrounded by spruce-fir forest on high elevational ridges. The dominant tree species present is *Fagus grandifolia.* These beech

Fig. 12. View from heath bald

Fig. 13. Little Pigeon River

gaps are geographically segregated islands of beech—most of the beech in the Smokies being found at much lower elevations as a member of various forest types.

Our next stop was at the Forney Ridge Parking Area at the foot of Clingman's Dome. Here the party split in two; some of our members to climb to the top of the mountain, which is 6642 feet, the others to follow the rugged mile and a half trail to Andrews Bald, which lies at the lower limit of the spruce-fir forest. Unlike the heath bald, which we had visited earlier in the day, Andrews is a grassy bald (Fig. 14). Near its lower margin is a sphagnum bog supporting moisture-loving grasses and sedges, as well as the round-leaved sundew *(Drosera rotundifolia)*.

In the understory of the spruce-fir forest *Viburnum alnifolium* and *Acer pensylvanicum* were abundant, while on the forest floor were two northern Lilaceous plants: *Clintonia borealis* and *Trillium undulatum*.

On the morning of Tuesday, May 25, we went first to the Park Headquarters at Sugarlands and spent an hour in the Museum with its superb exhibits of the geological history and the natural life of the Park. We also followed for a portion of the way a nature trail which adjoins the Museum. Here, in addition to the trees already mentioned, were the Indian pawpaw *(Asimina triloba)*, the sourwood *(Oxydendrum arboreum)* and the hornbeam *(Carpinus caroliniana)*.

We then retraced our steps through Gatlinburg, turned east for several miles and re-entered the Park from its northern boundary on a road which led us to Cherokee Orchard. Here we disembarked and set out to follow the Junglebrook Nature Trail which makes a loop of about three-quarters of a mile through a superb stand of mature hardwood forest.

Near the entrance to the trail stands a log cabin which is typical of those built and occupied by the early settlers. Another example of man's activity is a restored "tub" or turbine mill which was used for grinding corn.

We were greatly impressed by the size of the trees along this trail, for example, a sourwood with a trunk about 20 inches in diameter and a tulip tree 3½ feet in diameter. Indeed, we were informed that within the limits of the Park there are twenty species of trees which have attained record proportions.

Sassafras and silverbell were both abundant as were the two magnolias *(tripetala* and *Fraseri)* and in addition two trees not previously noted: yellow birch *(Betula lutea)*, and northern red oak *(Quercus borealis)*.

Among the plants growing on the forest floor were *Galax aphylla* (in full bloom) and *Clintonia umbellulata* (just coming into flower). Also conspicuous, on moist banks, was *Saxifraga micranthidifolia*, its large thin basal leaves suggestive of its common name: lettuce saxifrage.

After leaving the Junglebrook Nature Trail, we again left the Park, turned east for several miles, and re-entered the Park on a road which led us to Greenbrier Cove. Here we ate lunch by the clear, rushing waters of Porters Creek. After lunch we walked a very short distance along the road to examine a stand of very narrow, upright tulip trees. According to Mr. MacDonald this stand of trees is remarkable because of the number of clones present which possess superior characteristics for forestry research purposes.

On Wednesday, May 26, before leaving for home we returned once more to the Visitors' Center at Sugarlands and spent a pleasant hour in further enjoyment of its interesting exhibits. We then visited one of Gatlinburg's best known arts and crafts emporia and late that forenoon, with a distinct sense of nostalgia, turned our backs on the Great Smokies and headed northward on U.S. 11.

South of Greenville, Tenn., we pulled off the road and ate our lunches on a pleasant grassy bank. Not far away was a wooded area which we explored before resuming our journey. Although this turned out to be a rather dry, sterile woods we were delighted to find several small specimens of the wahoo or winged elm, *Ulmus alata*. This is a southern species which ranges from Florida and the Gulf States north to Kentucky and Virginia. Common here, also, was the New Jersey "tea," *Ceanothus americanus*, in full bloom. The deerberry here was the smaller *Vaccinium caesium*, rather than the more common *V. stamineum* which we had been seeing everywhere.

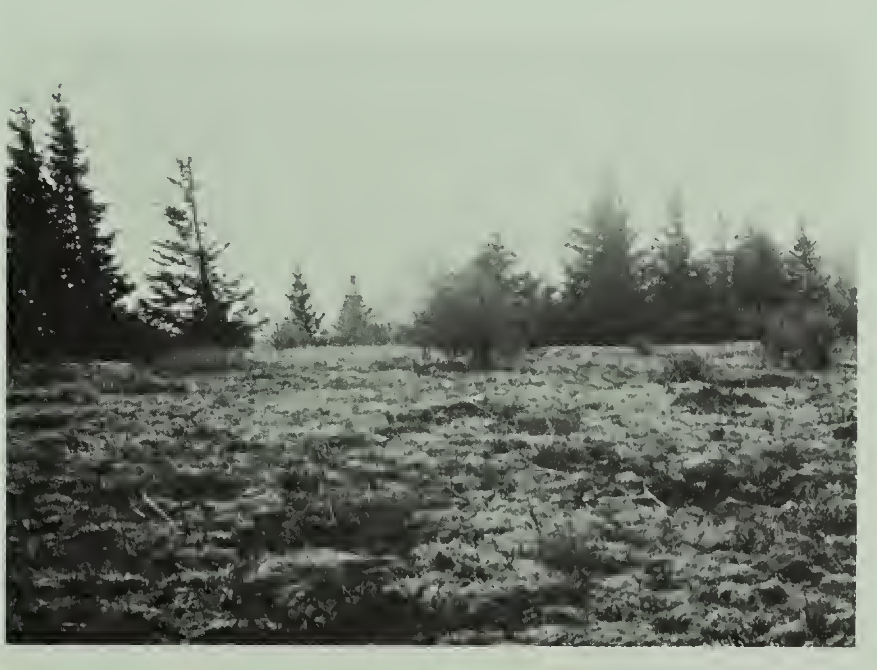

Fig. 14. Andrews Bald

Our route northward took us up a broad valley and provided distant views to the west of the Cumberland Plateau while far off to the east was the Blue Ridge along the crest of which we had driven a few days earlier. Our lodgings that night were at a comfortable motel at Bristol, Tenn.

The following day we drove through agricultural country, stopping for the night at Harrisonburg, Va., and on Friday May 28 we retraced our steps through Hagerstown and Carlisle and were back at the School on Lapsley Road by mid-afternoon.

It is a pleasure to acknowledge our indebtedness to the MacDonalds who contributed so importantly to the enjoyment of our stay in the Park. We are very grateful, also, to Dr. and Mrs. Ralph M. Sargent of Haverford, Pa., who aided us in mapping out our itinerary.

Figs. 1, 4, 5, 7, 10 and 13 by Albert M. Suggs

THE MONKEY PUZZLE TREE

The genus *Araucaria* is a member of a very ancient family of Gymnosperms which extends back perhaps more than a hundred million years into geologic time. Fossil cones of this genus have been found in Patagonia and Araucarian woody remains have been reported from many regions in the northern hemisphere in both the New and Old Worlds. Today, however, *Araucaria,* as a group of living plants, is restricted to the southern hemisphere.

The number of species varies according to the authority consulted. Rehder's "Manual" (ed. 2, 1940) gives it as ten. Dallimore and Jackson's "Handbook of Conifers and Ginkgoaceae," revised by S. G. Harrison (1967), recognizes fourteen (plus several cultivars). Willis's "Dictionary" (ed. 7, 1966) states that there are eighteen. Whatever the number, one thing is entirely clear: two of the species are native to South America, all of the rest occur in Australia and the islands of the South Pacific.

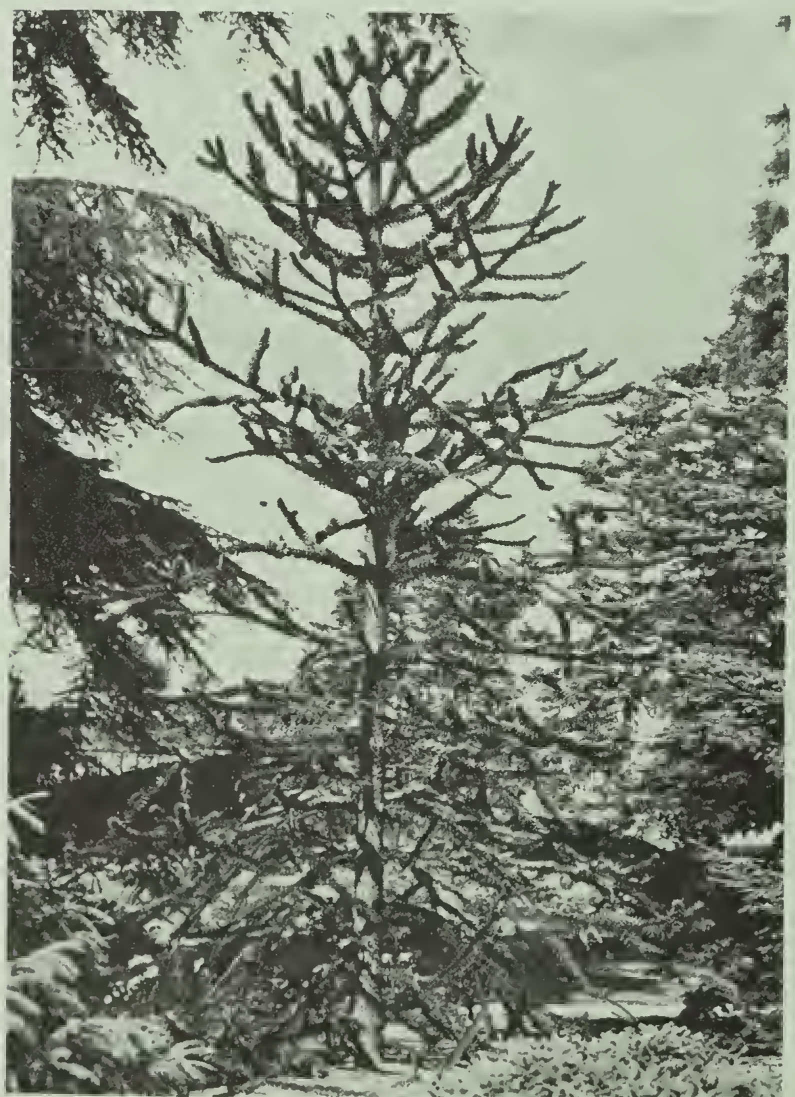

Fig. 1. *Araucaria araucana* at Waginengen, Holland

Fig. 2. *Araucaria araucana* at Bergen, Norway

Probably the best known member of the genus is *A. heterophylla* (long named *A. excelsa*) the so-called Norfolk Island Pine, native to the island of that name which lies in the South Pacific some 750 miles east of Australia. This species is widely cultivated in greenhouses and as a house plant.

Two Australian species, *A. Bidwillii* (bunya-bunya) and *A. Cunninghamii* (hoop-pine) are extensively grown in warmer parts of the world. At least six of the species are endemic to New Caledonia.

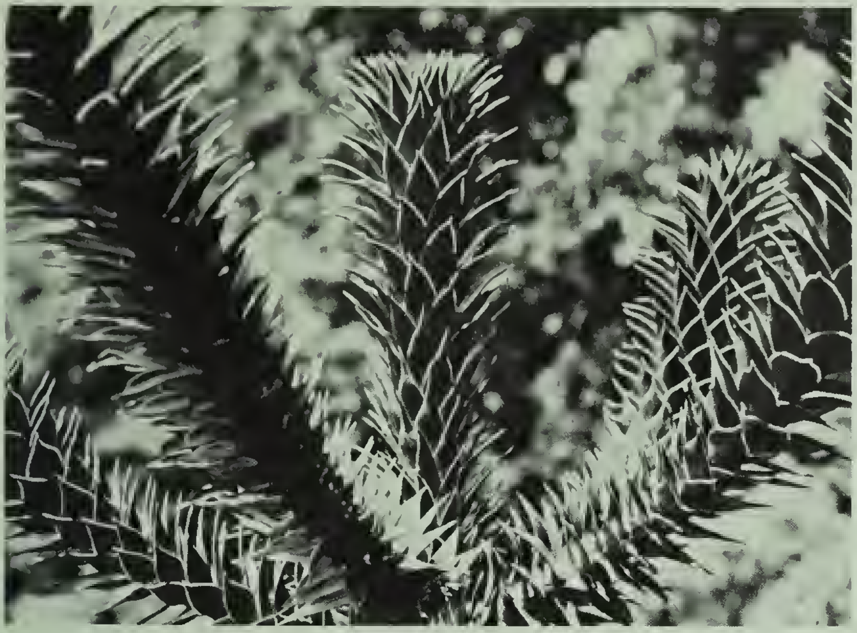

Fig. 3. *Araucaria araucana.* Close-up of leaves

The genus *Araucaria* takes its name from Arau Province in Chile, the home of the types species, *A. araucana* (Molina) K. Koch (formerly known as *A. imbricata*). The other South American species is *A. angustifolia* (Bert.) O. Kunze (of which *A. brasiliensis* A. Richard is a synonym). This species is found only in Southern Brazil and northern Argentina.

A. araucana is known commonly as Chile pine or monkey-puzzle tree. The latter name, according to Harrison, is said to have originated in England when a man, viewing its harsh, grotesque branches, observed that a monkey would have difficulty in climbing it.

The natural range of this species is in the Andes of Chile and Argentina, approximately between latitudes 37 and 39 south. Its wood is highly valued as timber and the seeds are eaten in Chile.

A. araucana was discovered about 1780 and was introduced into England by Archibald Menzies in 1795. It did not become common in cultivation, however, until the middle of the 19th century. Today it is extensively grown outdoors, not only in the British Isles but throughout western Europe. On our Arboretum tours we have seen it in Switzerland, Italy, Belgium and Holland. (Fig. 1) Perhaps the most amazing occurence was just outside the Botanical Garden at Bergen, Norway, where there is a tree over 40 feet tall. (Fig. 2).

The monkey-puzzle in its native home is capable of attaining a height of 30 m. (100 feet) or more. Its stout spreading branches usually occur in whorls of five. When young these may be horizontal, but in age they tend to curve upward and, by re-branching, impart to the tree a somewhat basket-like appearance. The branches are spirally clothed with stiff, evergreen, shiny leaves which terminate in a sharp spiny point. (Fig. 3)

A. araucana is not a tree which fits comfortably into any convential landscape planting. It is most effective when placed where it does not conflict with the softer texture of other coniferous or hardwood species. Probably the most impressive planting that most of us have had the good fortune to see is in the Geographic Arboretum of Tervuren, just outside of Brussels, where what seems to be a whole forest of these trees dramatically creates an image of its native Andean haunts.

Rehder's Manual characterizes this tree as hardy only in Zone VII, which deploys well to the south of us. One would therefore not expect to find it in cultivation in the Philadelphia area. Nevertheless, we are informed that there are two trees more than thirty feet tall in a private garden in Wilmington, Del. At one time the Longwood Gardens at Kennett Square, Pa., had a specimen about fifteen feet tall which was winter-killed a few years ago. It has been replaced by a specimen which is today between six and eight feet high.

Both Wilmington and Kennett Square lie only about thirty miles to the south of Philadelphia, but even such a short distance is often significant where plant hardiness is concerned.

Even more interesting is the reported occurrence of this species as hardy on Long Island, N. Y. Probably the reason for this is that proximity to the water may be conducive to a more moderate climate. We know, for example, that such plants as *Firmiana simplex* and *Sapindus Drummondii* thrive better at the Brooklyn Botanic Garden than they do in the Philadelphia area.

In 1960 Mrs. Barnes obtained a small plant of *A. araucana* from the Brimfield Nurseries in Connecticut. Believing it to be a slow-growing species, she placed it in one of the island beds devoted to dwarf conifers. Today, in its elev-

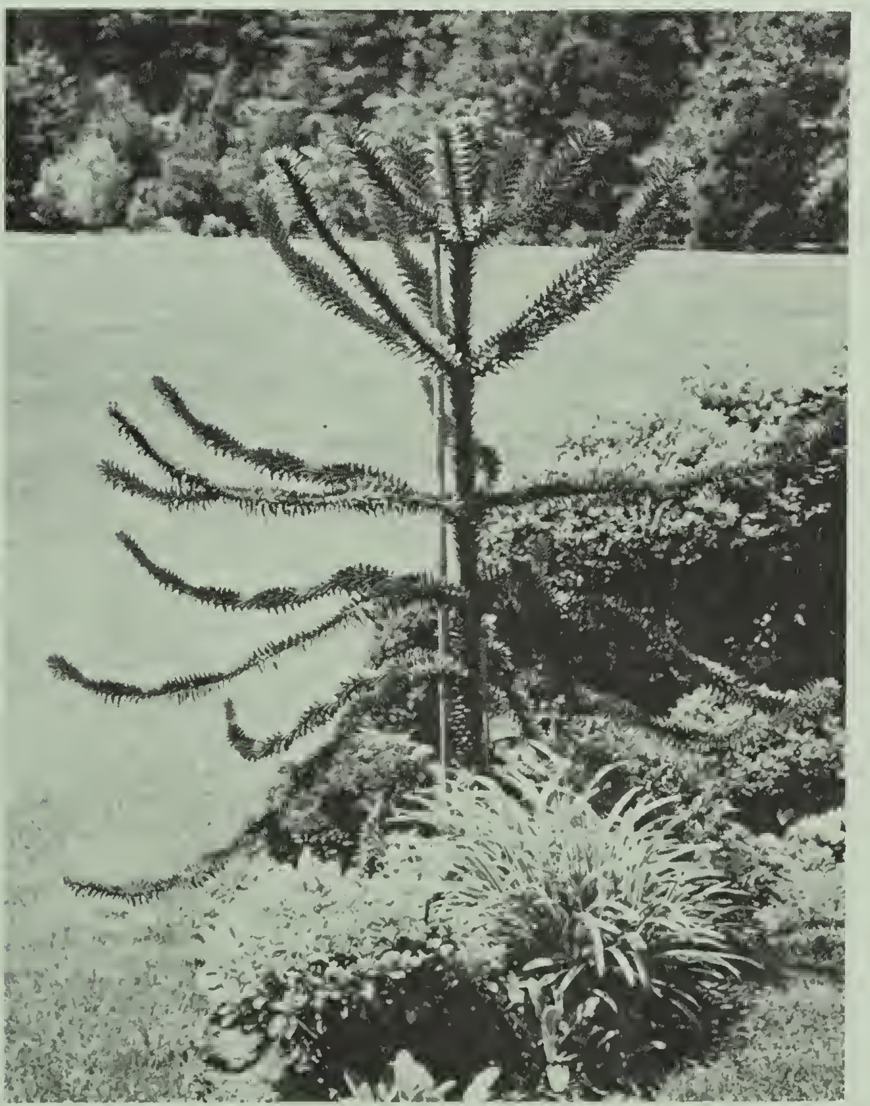

Fig. 4. *Araucaria araucana* at the Barnes Arboretum

enth year, this plant is six feet tall (Fig. 4). It has seven whorls of four or five branches each. Several of the branches have already developed forking at the tip. During the last three years it has made an annual terminal growth of six to eight inches.

Two of the lowermost branches have touched the ground and one of our gardeners has "pinned" them down in the hopes of layering them. To date they seem not to have produced roots, but they will be observed carefully in the future.

A final thought: South America has contributed very little to the realm of hardy woody plants in our eastern North American horticulture. If the Monkey-puzzle tree which comes from a latitude about as far south of the equator as Philadelphia is north, and from an altitude which has endowed it with some semblance of winter hardiness, can be grown in the Philadelphia area, may there not be other plants from South America which would prove adaptable to this part of the world?

J. M. F., Jr.

NOTES FROM THE ARBORETUM

THE STAFF

We regret to report the resignation of Mrs. Thomas H. Atherton who for several years has so effectively taught the basic course in Horticulture. She and her husband have moved from the Philadelphia area and taken up their residence in Chestertown, Maryland.

We have been very fortunate in filling Mrs. Atherton's position by the appointment of Mrs. John E. Hopkins. Mary Hopkins, a former student in the Arboretum School, received her bachelor's degree from Mt. Holyoke College. She taught at Episcopal Academy for four years and for two years was Principal of an elementary school in Radnor Township. She was also Lecturer at the Philadelphia Art Museum for several years. We are happy to welcome her as a member of the Faculty.

Dr. Gordon reports the following activities: On April 28 gave a talk entitled "Looking Ahead in Ecology" to the MORA Club.

Attended the annual foray of the Torrey Botanical Club which was held at Mountain Lake, Va. from June 11-15.

With Mrs. Gordon attended the annual meeting of the Vermont Botanical and Bird Club with headquarters at Stowe, Vermont.

On June 29 visited The Garden in the Woods at Framingham, Mass., which is now the headquarters of the New England Wild Flower Society.

Served, on July 1, as leader and consultant on a day of field activities for a work shop on environmental studies sponsored by the School of Science and Mathematics of the West Chester State College.

Dr. Swartley traveled to Denver, Col. and from there drove to Aspen and ascended to more than 12000 feet to study the rich Alpine flora.

Dr. Zirkle completed a manuscript entitled, "Panspermia and some of its Implications and Complications," for early publication in The Journal of the History of Biology.

Dr. Fogg was the speaker at the annual banquet of the Louisiana Society for Horticultural Research held at the University of Southwestern Louisiana at Lafayette on March 6. His topic was "A Botanist in Japan and Taiwan." On March 14 he gave an illustrated lecture on "Botanical Gardens of South Africa" before the Philadelphia Cactus and Succulent Society and on March 22 he spoke to the St. Davids Horticultural Society on "Philadelphia in Spring."

April 14 he presented an illustrated talk on "The New Jersey Pine Barrens" before the Delaware Valley Chapter of the American Rock Garden Society. At the Annual Meeting of the University of Pennsylvania Chapter of the Sigma Xi on April 21 he spoke on "Plants and People—A Partnership of Botany and Medicine."

THE BEGINNINGS OF A HEATH GARDEN

One of the most fascinating families of woody plants hardy in this area is the Ericaceae or Heath Family which, in addition to containing the heaths *(Erica)* and the heather *(Calluna),* includes such familiar plants as rhododendrons, azaleas, mountain laurel, wintergreen, sourwood, trailing arbutus and the blueberries and huckleberries.

In an effort to bring together in one spot as many of these forms as feasible we opened up in the summer 1970 a small bed about 7 x 24 feet. This is situated on the south-facing slope just west of the dwarf-conifer beds.

After digging out this bed we filled it with peat and leaf-mould, then added two tons of white sand. All of these ingredients were thoroughly mixed and the bed was allowed to "ripen" over the winter months. In early spring large stones were strategically placed to improve the drainage and to form an attractive background for the heathers and such trailing species as *Vaccinium crassifolium.*

The first plants were set in place on April 19, 1971. They were a gift from Mrs. Pamela Harper, (at that time of Bel Air, Maryland) who came in person to plant them. Mrs. Harper, for several years an active and influential member

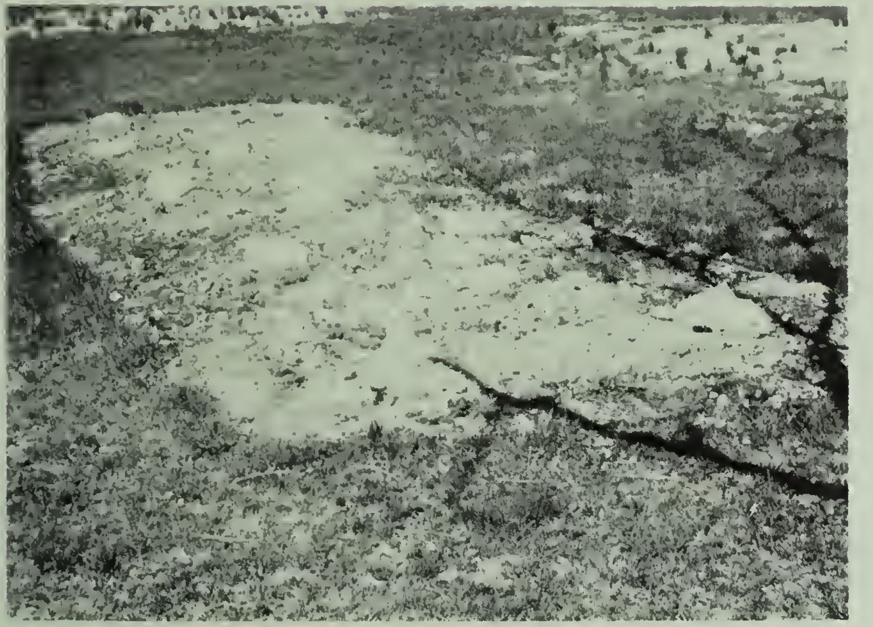

Fig. 1. Heath garden before planting

of the British Heather Society, is now living in this country. She brought us several specimens each of four cultivars of *Calluna vulgaris,* two of *Erica carnea,* one of *E. tetralix* and a plant of *E.* x *Williamsii.*

Our next addition was received from Mr. Matthew Nosal of the Holly Heath Nursery of Wading River, New York. This consisted of two cultivars of *Calluna* and several of *E. carnea, E. cinerea, E. tetralix* and *E. vagans.*

Up to this point our budding collection was made up solely of heaths and heathers, but on July 10 we received a very exciting assortment of Ericaceous plants from the Don Smiths of Watnong Nurseries in Morris Plains, N. J. This lot included six cultivars of *Calluna* and three of *E. carnea,* but in addition representatives of fifteen other genera belonging to this family. Among them were *Andromeda, Bruckenthalia, Cassiope, Daboecia, Enkianthus, Epigaea, Gaultheria, Kalmia, Kalmiopsis, Ledum, Leiophyllum* and *Vaccinium.*

For several years Don and Hazel Smith, proprietors of Watnong, have been assembling clonal material of the famous box huckleberry *(Gaylussacia brachycera)* from different localities throughout its restricted range. Their objective has been to bring about cross-pollination and hence the formation of viable seeds in a species which is reputedly sterile to its own pollen in any given colony. The specimens which they sent us of this low evergreen huckleberry came from four different stations, so these plants will be observed with great interest to see whether or not they produce fruit.

Another species of considerable interest to the botanist is an evergreen blueberry *(Vaccinium Vitis-Idaea)* commonly known as mountain cranberry. This subshrub, with creeping rootstocks and upright stems to about 10 inches, occurs all across northern Europe and northwestern Asia and in this continent from Labrador south to Massachusetts and west to Alaska and British Columbia. The Old World population has been designated as var. *majus* and the somewhat smaller plant of northern North America as, var. *minus.* The Don Smiths sent us both varieties and if they survive it will be interesting to observe whether these differences in size are perpetuated.

It was the mountain cranberry, according to the late Professor M. L. Fernald, which was the vinbeer or wineberry of the Viking Sagas, rather than any kind of grape, and which led to the Norsemen referring to their eleventh or twelfth century landfall in the New World as Winland der Gut.

More recently (July 26) Mrs. Willard Houghton, a former student of the Arboretum School, gave us a plant which her late husband had obtained under the name of *Pernettya nana.* This epithet does not appear in the literature and we are inclined to believe that the correct name for the species is *P. prostrata,* a native of South America.

Although the genus *Rhododendron* belongs to the Ericaceae, its more than 600 species (including the azaleas) are usually so large as to exclude them from admission to a heath garden where the emphasis is on miniature habit. Also, the genus is well represented by scores of species, hybrids and cultivars elsewhere on the grounds of the arboretum. Nevertheless, we have made an exception in the case of two species which have been placed in our embryonic collection. One is *R. Degronianum,* a low-growing evergreen shrub with narrow leaves, which are rufous-tomentose beneath, and luscious pink flowers which appear in late April and early May. The other is a dwarf form of *R. racemosum,* a deciduous Chinese species also with pink, though somewhat smaller, corollas. It may well be that as our heath garden is expanded in the future additional low-growing species of this important genus will be added.

The only plant in the collection at present which is not a member of the Ericaceae is Conrad's crowberry *(Corema Conradii).* This low, conifer-like shrub, which belongs to the Empetraceae, occurs in dry sandy soil from Newfoundland south to the Pine Barrens of New Jersey. It is so commonly associated in the same habitat with members of the Heath Family that admission requirements were waived and it was taken into the fold.

There follows a comprehensive listing of the plants now found in our Heath Garden. Future numbers of this publication will follow their careers and call attention to the enlargement and augmentation of this special collection.

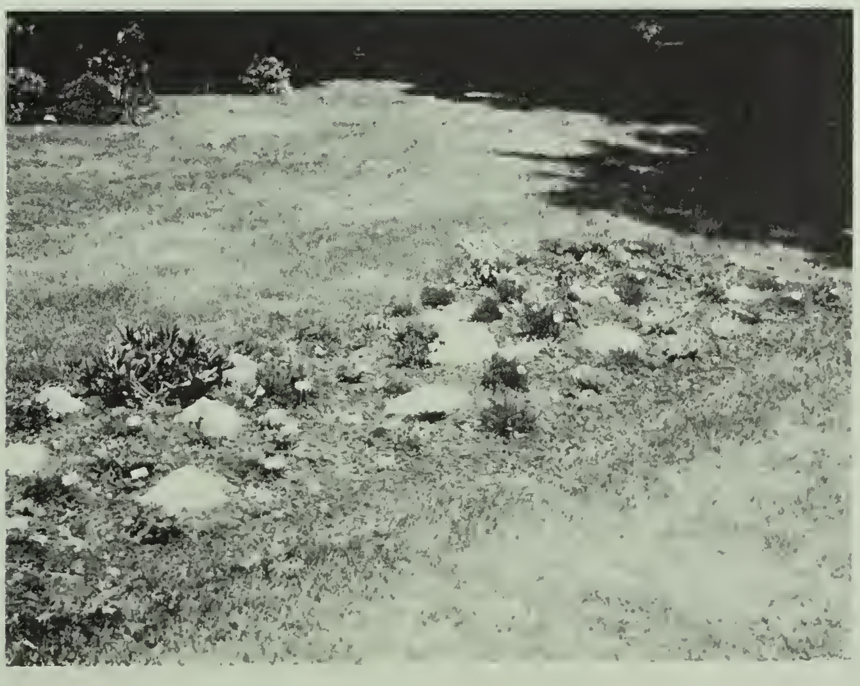

Fig. 2. Heath garden after planting

Andromeda glaucophylla
A. polifolia
Bruckenthalia spiculifolia
Calluna vulgaris 'Beoley Gold'
C.v. 'County Wicklow'
C.v. 'Cuprea'
C.v. 'Else Frye'
C.v. 'Fox Hollow'
C.v. 'Hammondii Aureifolia'
C.v. 'Humpty Dumpty'
C.v. 'Martha Herman'
C.v. 'Rigida'
C.v. 'Sister Anne'
C.v. 'Sunset'
C.v. 'Valorian'
Cassiope lycopodioides
Chamaedaphne calyculata nana
Corema Conradii
Daboecia cantabrica 'Alba'
D.c. 'Crimson'
Enkianthus cernuus 'Rubens'
E. perulatus
Epigaea repens
Erica carnea 'December Red'
E.c. 'Pink Spangles'
E.c. 'Springwood Pink'
E.c. 'Springwood White'
E.c. 'Vivellii'
E.c. 'Winter Beauty'
E. cinerea 'Violacea'
E. tetralix 'Alba Mollis'
E.t. 'Praegeri'
E. vagans 'Lyonesse'
E.v. 'Mrs. Maxwell'
E. x. Williamsii
Gaultheria Miqueliana
G. nummularioides
G. Shallon
Gaylussacia brachycera
Kalmia angustifolia
K. polifolia 'Nana'
Kalmiopsis Leachiana
Ledum groenlandicum 'Compactum
Leiophyllum buxifolium 'Prostratum'
Leucothoe axillaris
Pernettya prostrata
Rhododendron Degronianum
R. racemosum
Vaccinium angustifolium
V. crassifolium
V. Vitis-Idaea majus
V. V-I. minus

LIBRARY ACCESSIONS

The following are among the items added to the Library during recent months.

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